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Interpersonal styles in major and chronic depression: A systematic review and meta-analysis

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Abstract

Background. McCullough's (2000) theory of chronic depression posits that a hostile-submissive interpersonal style distinguishes chronically depressed individuals from those with Major Depressive Disorder (MDD). This study sought to determine to what extent hostility and submissiveness feature in MDD, and whether there is evidence for a stronger effect in chronic depression.

Methods. A systematic literature search was conducted for research measuring the relationship between depression and hostility and/or submissiveness. A meta-analysis was carried out to determine the strength of the relationship. Separate analyses were conducted for the effects of hostility, submissiveness, and hostile-submissiveness. Subgroup analyses were performed comparing the effect sizes of chronic depression and MDD.

Results. Twelve studies met criteria for inclusion. Subgroup analyses revealed large effect sizes for submissiveness ($d = 0.86$) and hostile-submissiveness ($d = 0.93$) in chronic depression, and a medium effect for hostility ($d = 0.72$). MDD was associated with medium effects for hostility ($d = 0.58$) and hostile-submissiveness ($d = 0.63$), and a small effect for submissiveness ($d = 0.40$).

Limitations. The review yielded a small number of papers, particularly in relation to chronic depression. The majority reported secondary analyses using baseline samples of intervention trials, with normative data as controls. Quality scores were generally low, and analyses revealed high heterogeneity, which may indicate differences between clinical populations studied.

Conclusions. The review provides preliminary evidence that individuals with chronic depression are more hostile-submissive than those with MDD. Results highlight the limited research into interpersonal correlates of chronic depression.

Keywords: CBASP; Chronic Depression; Interpersonal style; Meta-Analysis

Introduction

Around one fifth of those meeting diagnostic criteria for Major Depressive Disorder (MDD) will experience episodes lasting two years or more without remission (Keller et al., 1992). In addition, a high proportion of those experiencing MDD experience at least one subsequent episode (Lavori, Dawson, & Mueller, 1994; Pincus & Pettit, 2001; Williams et al., 1997). Chronic depression, where depressive symptoms are present for two or more years, is associated with greater psychosocial and occupational impairment than acute forms of depression, including time spent off work, unemployment, use of health services, lower socio-economic status, and marital breakdown (Swan & Hull, 2007; Wells, Burnam, Rogers, Hays, & Camp, 1992). Despite the prevalence and consequences of chronic depression, it remains relatively under-researched and poorly understood (Constantino et al., 2008). Given the poor outcomes associated with this disorder, understanding its aetiology and maintenance factors would provide important insights for designing treatments for chronically depressed individuals. This paper sought to establish the current evidence for a recent model of chronic depression put forth by McCullough (2000, 2006), where individuals with chronic depression are described as having an excessively submissive and hostile interpersonal style, which acts to maintain depression by depriving individuals of positive interpersonal experiences. This review aims to establish to what extent the current literature supports this hypothesis.

Interpersonal functioning has been found to be a key feature in both causing and maintaining MDD. Factors such as submissiveness, dependency, and interpersonal skill deficits have all been found to feature (Constantino et al., 2008; Coyne, 1976; Joiner, 2002). McCullough (2000) hypothesised that although these factors feature in acute depression, they manifest as more stable and severe in chronically depressed individuals. The model describes chronic depression as being associated a worldview based on past experience, rather than the present reality (McCullough, 2006). The hypothesis is that persistent depression is associated with both hostile detachment and excessive submissiveness (Constantino et al., 2008; McCullough, 2000; Swan & Hull, 2007).

Understanding the psychological and interpersonal correlates of chronic depression is particularly important given the limited effectiveness of current

treatments. The literature on attachment styles in depression provides some evidence of the role interpersonal processes might play in the aetiology and maintenance of depression (McBride, Atkinson, Quilty, & Bagby, 2006; Reis & Grenyer, 2004), but to date, there appears to be a relative lack of literature exploring these correlates or underlying mechanisms in more detail. One recent study has set out to investigate the interpersonal styles of chronically depressed individuals, and provided some support for McCullough's hypothesis (Constantino et al., 2008). However, the study used a convenience sample taken from a previous trial and used a small, non-randomised sample of healthy volunteers as a comparison condition. Another key gap in the literature is the apparent lack of research into factors, if any, that differentiate MDD from persistent depression.

This review aimed to assess whether the current literature supports the hypothesis put forth by McCullough, that individuals suffering from chronic depression exhibit a hostile-submissive, or socially avoidant, interpersonal style. Including both MDD and persistent depression allowed the review test the specificity of McCullough's model. Specifically, the assumption in the CBASP model that levels of hostility and submissiveness in persistent depression would be higher than in MDD.

The review sought to test the following hypotheses:

1. MDD overall will be associated with both hostile and submissive interpersonal styles.
2. Chronic depression will show a greater association with hostility and submissiveness than MDD.

Methods

Search strategy

The following databases were searched from inception, with searches covering up to January 2016: Embase (1980 – January 2016), Medline (1946 to January 2016), PsycInfo (1806 to January 2016), ASSiA (1984 to January 2016), CINAHL (1937 – January 2016). Searches sought to identify studies that reported a relationship between depression in individuals with MDD with measures of hostility and submissiveness. Searches sought to identify studies relating to 'depression' (depression, depressed, depress*), and search terms were combined using AND to terms relating to

‘submissiveness’ (submissiveness, submissive, submiss*, agency, assertive*, dominant, dominance, power, passiv*) OR ‘hostility’ (hostility, hostile, hostil*, friendliness, unfriendly, communion, cold*) OR ‘Interpersonal’ (interpersonal, interpersonal circumplex, impact message, interpersonal style). Other appropriate search terms as identified by the individual databases were also included.

Inclusion criteria

The inclusion criteria of the review stipulated that studies had to be published in English, and using a sample of adults (aged 16 and above) with a primary diagnosis of Major Depression, established prior to the research commencing. Included studies also required a validated measure of either submissiveness, hostility, or both. Studies using a single item from a validated scale would be excluded. Both self-report and clinician/significant other rated measures were included. Only peer-reviewed research published in academic journals was included.

For the review, MDD was defined as having been assessed and found to meet diagnostic criteria for Major Depression based on either DSM or ICD-10 criteria. Chronic Depression was defined as a depressive episode lasting two years or longer, where the individual has experienced previous episodes. This included Chronic MDD (lasting 2 years or longer), recurrent MDD with a continuous duration two years or more, dysthymia, or MDD with pre-existing dysthymia (Double Depression). In line with the Interpersonal Circumplex, Interpersonal submissiveness was defined as low assertiveness and agency, while interpersonal hostility was defined as avoidance of others and a lack of warmth towards others. Hostile-submissiveness was defined as social avoidance.

Exclusion criteria

Studies were excluded if the diagnostic status of the sample was established post-hoc simply by using cut-off scores on measures of depression, or where papers used non-clinical samples. Papers were also excluded if they did not use quantitative data or reported single cases. Non peer-reviewed research including dissertations and book chapters was excluded, as were papers not published in the English language.

Summary of searches

Figure 1 presents a flowchart of the search process. The initial literature searches yielded a total of 4112 results (783 from Embase, 688 from Medline, 1629 from PsycInfo, 651 from ASSiA, and 361 from CINAHL). A total sample of 3003 studies was retained after deduplication. Firstly, titles of included studies were screened, after which 253 studies were retained. Abstracts of these studies were then screened, leaving a final sample of 40 studies (29 Major Depression, 11 Chronic Depression). Full texts of these were then reviewed. One study was excluded as it presented the results of the same sample as an earlier study (Constantino et al., 2008), 14 were excluded because they did not use validated measures of hostility or submissiveness, 5 were excluded because they did not report the associations between measures, 6 did not present adequate data to establish diagnostic status, 2 used samples of recovered MDD patients, and 4 studies were excluded because they did not report a comparison group. Twelve studies were included in the systematic review, and 8 of these were included in the meta-analysis. Of the studies included in the review, three included chronically depressed patients, and nine included patients with MDD as a primary diagnosis.

Quality assessment of included studies

The studies included in the review were quality rated in relation to their suitability for addressing the aims of the current research. As the majority of quality rating instruments for systematic reviews focus on research evaluating effectiveness of interventions, these were not thought to be appropriate. A quality assessment measure was devised based on those used in previously published meta analyses and systematic reviews of observational study, and with reference to the recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) initiative (Matcham, Rayner, Steer, & Hotopf, 2013; von Elm et al., 2007). Seven items were devised, with the measure yielding a total quality score for each study out of a maximum score of 12 (See Appendix A for the measure used). Table 1 presents a summary of the quality of each study, along with an overall quality score.

Data extraction

Extraction of information from studies was performed by the first author and checked by an independent rater using an extraction form. Discrepancies were resolved through discussion.

The majority of reviewed studies were cross-sectional and reported group comparisons between depressed individuals and controls. For these studies, therefore, Cohen's d was calculated. Where studies reported correlations, r values were converted to Cohen's d using a formula provided in Borenstein et al. (2009). Models were first run without including these studies, and studies were included if they did not significantly change the pooled estimates.

Data analysis

We employed meta-analysis to evaluate the size of the effect for interpersonal style on depression. Three analyses were carried out, for submissiveness, hostility, and for hostile-submissiveness. Moderator analysis were carried out to compare chronic depression with MDD where at least two studies provided suitable data for each subgroup. Where studies reported correlations rather than mean differences, correlation coefficients were converted to Cohen's d using the formula provided in Borenstein, Hedges, Higgins, and Rothstein (2009). Moderator analyses were conducted to evaluate their effect on the models, and where they did not alter the results substantially they were included in the reported analyses. Analyses were undertaken using the Meta Analysis via Shiny package for R (MAVIS; Hamilton & Mizumoto, 2015). Random-effects models were used in order to take into account the heterogeneity of the sample of included studies (due to differences between samples, measurement instruments, etc).

-----INSERT FIGURE 1 AROUND HERE-----

Results

Characteristics of included studies

Characteristics of included studies are presented in Table 2. All studies presented cross-sectional data, with most utilising baseline data from randomised controlled trials, with data from normative studies as comparisons. All studies took place in Western countries (USA, Germany, UK). The main interpersonal measures were the Impact Message Inventory (IMI; therapist-completed) and the Inventory of Interpersonal Problems (IIP; self-report). One study used the Submissive Behaviour Scale (SBS; O'Connor et al., 2002), and two studies used the NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992). Three studies did not include any comparison groups (Cain et al., 2012; Dinger et al., 2015; Lam, Schuck, Smith, Farmer, & Checkley, 2003). For consistency, where multiple comparison groups were included, meta-analyses were conducted using comparisons with non-clinical controls (only one study included a direct comparison between persistent depression and acute depression; Constantino et al., 2008).

All studies were assessed in terms of quality for addressing the aims of the current review. None of the included studies scored above 8/12 for quality. No studies reported any power calculations, and only one study utilised a random sampling strategy. The majority of studies used either convenience samples or baseline data from intervention trials. Similarly, comparison conditions came from normative studies or convenience samples of healthy volunteers. Given that no studies reported power calculations, there is a possibility that samples were underpowered, especially to detect small or moderate effects. All studies employed validated measures of depression (BDI-II or HRSD) and interpersonal style (IIP, IMI, SBS, NEO PI-R). A sample of the included studies was rated for quality by an independent rater. Inter-rater reliability (Cohen's Kappa) was found to be 0.86, indicating outstanding agreement (Landis & Koch, 1977), with 90.5% agreement.

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Interpersonal style in depression

Hostility. The review found 11 studies that reported a relationship between hostility and depression. Three studies used chronic depression samples, with two finding large effects and one (McCullough et al., 1994) finding a small effect. All three of these studies reported comparisons between chronically depressed participants and non-clinical controls, though the comparison condition in one paper was made up of only 6 individuals who had previously experienced MDD and were in remission (McCullough et al., 1988). Eight studies were included which reported a relationship between hostility and MDD. Of these, four were cross-sectional studies comparing a clinical sample against non-clinical controls, and four were cross-sectional studies without comparison conditions. Findings were mixed, with effect sizes of the association ranging from large (Gotlib & Whiffen, 1989) to small (Grosse Holtforth, Altenstein, Ansell, Schneider, & Caspar, 2012), and one study reported a weak negative association (Bagby et al., 1997). However the sample of this latter study was qualitatively different from the others in that it reported differences between high- and low-hostile patients with MDD, with those with lower scores reporting more depressive symptoms (compared to other studies that reported either correlations for a clinical sample or group differences between clinical and non-clinical participants). All studies used validated measures of hostility, including IIP, IMI, and NEO.

-----INSERT TABLE 2 AROUND HERE-----

A meta-analysis was performed to determine the overall estimate of the relationship between hostility and depression. All studies were included where Cohen's d was calculable based on available data. Two were excluded (Bagby et al., 1997; Cain et al., 2012) as they did not provide adequate data to calculate an effect size. Two correlational studies were included in the analysis (Dinger et al., 2015; Lam et al., 2003), with the Pearson's r value converted to d using the formula provided in Borensetin et al. (2009). The Random Effects model revealed an overall effect size of $d = 0.61$ (95% CI 0.38 – 0.84, $N = 2516$, $Q = 34.98$, $p < .001$, $I^2 = 77\%$). A moderator analysis revealed a larger effect for chronic depression (0.72 , 95% CI 0.41 – 1.03, $n = 407$, $I^2 = 18\%$) than MDD (0.58 , 95% CI 0.31 – 0.86, $n = 2109$, $I^2 = 82\%$), though both represented medium effect sizes.

-----INSERT FIGURE 2 AROUND HERE-----

Submissiveness. Eleven studies reported a relationship between depression and submissiveness. Again, three studies reported on samples of chronically depressed individuals while the rest included individuals with MDD. Studies used either the IIP, IMI, NEO, or SBS as measures of submissiveness. As with Hostility, studies reported a range of effect sizes varying from 0.2 to 1.31. One study reported that individuals with submissive personality type experienced more impaired functioning than other personality types (dominant, arrogant, cold, unassuming; $d = 0.80$; Cain et al., 2012). This personality type was also found to be associated with chronicity of MDD ($d = 0.86$) compared with all except hostile individuals. Overall, studies with larger sample sizes tended to report smaller effects of submissiveness on depression.

Of the studies included in the review, one was excluded from the meta-analysis (Cain et al., 2012) as it did not provide enough information to calculate Cohen's d . Two of the included studies reported correlation coefficients and regression coefficients which were converted to d (Dinger et al., 2015; Lam et al., 2003). The RE model found a pooled effect estimate of 0.47 (95% CI 0.29 – 0.66, $N = 2615$, $Q = 27.55$, $p < .001$, $I^2 = 67\%$). Moderator analysis again revealed a larger pooled estimate for chronic depression ($d = 0.86$, 95% CI 0.11 – 1.62, $n = 404$, $I^2 = 79\%$) than for major depression ($d = 0.40$, 95% CI 0.22 – 0.59, $n = 2211$, $I^2 = 64\%$).

-----INSERT FIGURE 3 AROUND HERE-----

Hostile-Submissiveness. A total of 6 studies in the review included a measure of hostile-submissive interpersonal style. Two of these used samples of individuals with chronic depression (Constantino et al., 2008; McCullough et al., 1994), and 4 included individuals with MDD (Barrett et al., 2007; Dinger et al., 2015; Grosse Holtforth et al., 2012; Lam et al., 2003). Both chronic depression studies reported large effect sizes for the association between depression and hostile-submissiveness, while there was some variation between MDD studies, with effects ranging from small to large. All studies included either the IIP or IMI as interpersonal measures. Two studies reported correlations (Dinger et al., 2015; Lam et al., 2003), and the rest reported mean difference between clinical samples and controls.

For meta-analysis, correlation values were converted to Cohen's d and included as they were not found to change the results. Meta-analysis yielded a moderate pooled effect size estimate ($d = 0.71$, 95% CI 0.44 – 0.98, $N = 2376$, $Q = 31.02$, $p < .001$, $I^2 = 84\%$). A subgroup analysis was again performed, and revealed a difference between the two diagnostic groups. For chronic depression studies, the effect size was large ($d = 0.93$, 95% CI 0.68 – 1.19, $n = 372$, $I^2 = 0\%$) whereas for the MDD studies there was a medium effect ($d = 0.63$, 95% CI 0.31 – 0.95, $n = 2004$, $I^2 = 87\%$).

-----INSERT FIGURE 4 AROUND HERE-----

Discussion

The review aimed to establish to what extent submissiveness and hostility are present in Major Depression, and whether there is evidence of stronger effects for individuals with chronic depression compared with MDD. Systematic literature searches identified 12 studies meeting inclusion criteria for the systematic review. Meta-analyses were then carried out to establish the strength of the effect of hostility, submissiveness, and hostile-submissiveness in this population. Each analysis included a subset of the studies in the review. The results of the meta-analyses provide evidence that submissiveness and interpersonal hostility are elevated in individuals with MDD compared with non-clinical controls. Across all three analyses, subgroup comparisons showed a larger effect for individuals with chronic depression than for individuals with MDD, consistent with McCullough's (2000) theory of chronic depression. This difference was especially evident for studies that included a measure of hostile-submissive (socially avoidant) style, and for submissiveness, large effects were found for chronic depression, compared with medium effects for MDD.

There was evidence that hostile-submissiveness was higher in non-remitted MDD patients than those who remitted (McCullough et al., 1988), and that depressed individuals classified as submissive and hostile experienced greater chronicity of current episode than individuals classified as extraverted, dominant, arrogant, or unassuming (Cain et al., 2012). Only one study in this review included a direct comparison of persistent depression with acute depression. Constantino et al. (2008) found that these two groups did not differ in submissiveness, friendly-submissiveness, or hostile-submissiveness, but did differ in levels of hostility ($d = 0.70$), suggesting that submissive behaviour might be related to depressive pathology more generally, in line with previous literature (Joiner, 2002; Segrin, 2001). The current review indicated differences between chronically depressed individuals and acutely depressed individuals in all three analyses, and particularly for submissiveness and hostile-submissiveness.

The review yielded a relatively small number of studies, particularly relating to chronic depression. This may reflect that it is only relatively recently that authors have begun to identify how common recurrent MDD and chronic depression are (Lavori et al., 1994; Pincus

& Pettit, 2001; Wells et al., 1992), and that this population has to date been generally under-researched and poorly understood (Constantino et al., 2008; Swan & Hull, 2007). Given the prevalence of chronic depression and the known consequences, including increased risk of unemployment, marital breakdown, lower socio-economic status, and increased use of health services, the review highlights a need for further research to better understand its aetiology (Swan & Hull, 2007; Wells et al., 1992).

Implications for treatment

The review's findings could have important treatment implications. The general finding that individuals with clinical depression tend to behave in hostile and submissive ways has important implications for treatment generally. A patient behaving in a hostile manner will likely evoke feelings of hostility in his or her therapist, and similarly a submissive patient will likely evoke a feeling of dominance in the therapist (Horowitz, 2004; Kiesler, 1983). McCullough (2000) recommends that therapists complete the IMI early in treatment in order to form their own understanding of patients' interpersonal functioning. Doing so allows the therapist to identify the interpersonal 'pulls' of the patient and avoid reacting with complimentary hostility and dominance, in order to avoid perpetuating the patient's interpersonal stance. By understanding a patient's interpersonal style, the therapist can identify when feelings of hostility are being evoked, and instead adopt the more beneficial interpersonal style (McCullough, 2000).

Interpersonal Psychotherapy (IPT) has a good evidence base for treating MDD (Cuijpers et al., 2011; van Hees, Rotter, Ellermann, & Evers, 2013). However studies into its effectiveness for chronic depression have yielded mixed findings (Cuijpers et al., 2010). Nonetheless our findings are in line with the 'Interpersonal Sensitivities' focus area in IPT, which describes a difficulty in forming and maintaining relationships leading to social isolation and loneliness (Lipsitz, 2009). Patients in this focus area have been described as exhibiting passivity and hostility in the therapeutic relationship (Wurm, Robertson, & Rushton, 2008). This IPT focus area shares with CBASP the goal of helping patients to start to discriminate between past maladaptive relationships and current relationships, and to start to gain an understanding

of the interpersonal patterns that tend to impede the formation of relationships, including with the therapist. The review's findings indicate that individuals with chronic depression would be likely to present with difficulties in this domain.

Limitations of the review

The review's findings are limited by a number of factors. Firstly, high levels of heterogeneity were found in all three meta-analyses. Subgroup analyses provided some explanation, with chronic depression generally showing less heterogeneity than MDD, though there were fewer studies. The small numbers of studies in the analyses precluded the use of meta-regression as a means of exploring the heterogeneity (Thompson & Higgins, 2002). However, the total samples for all of the analyses were large given the number of included studies. The high levels of heterogeneity reflect the limited research in this area, and the limited quality of the included studies. The majority of the studies in the review presented secondary analyses of data from RCTs and case series, with either convenience samples or normative data from other studies as non-clinical control samples. This methodological diversity is likely to have contributed to the heterogeneity in the analyses. Overall, the high levels of heterogeneity highlight the need for well-designed, adequately powered studies in this area.

A second limitation of the review was the lack of studies comparing chronic depression and MDD. Only one study provided a comparison (Constantino et al., 2008). This absence of a direct comparison limits the conclusions we can draw in relation to the hypothesis that chronic depression would be associated with increased hostility and submissiveness compared with MDD. In addition, the quality of included studies varied, and most of the included studies had small, non-randomised samples.

Conclusions and recommendations

The results of this review provide evidence that individuals with both major depression and chronic depression display a hostile submissive interpersonal style, supporting our first hypothesis. There was also support for our second hypothesis that individuals with chronic depression would be more hostile-submissive than those with acute depression. Results in this area were limited by the lack of direct comparisons between the two clinical populations. The review and meta-analysis revealed that the empirical research in this area is limited, with many of the studies included in the review using baseline data from intervention studies with normative samples as comparison conditions. Findings should therefore be interpreted in the context of these limitations. Specifically, the limited number of relevant studies reflects a lack of research and prevents us from drawing clear conclusions regarding the validity of McCullough's theory. Further research is now needed in order to directly compare interpersonal styles of chronically depressed individuals with those with MDD. There is a need for studies using robust recruitment methods, with clear reporting of power calculations. Additionally, given that CBASP is designed specifically to engage individuals with hostile-submissive interpersonal styles, research into its ability to engage and retain these patients would provide a potential validation of the therapeutic model.

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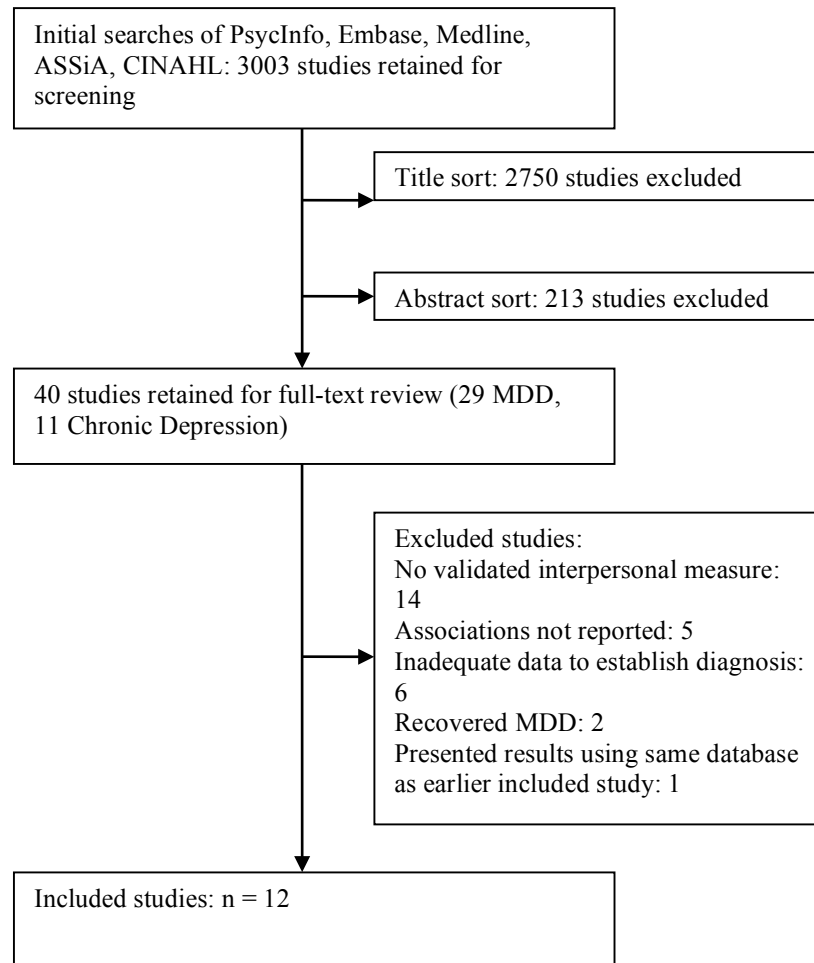


Figure 1. Literature search strategy flowchart.

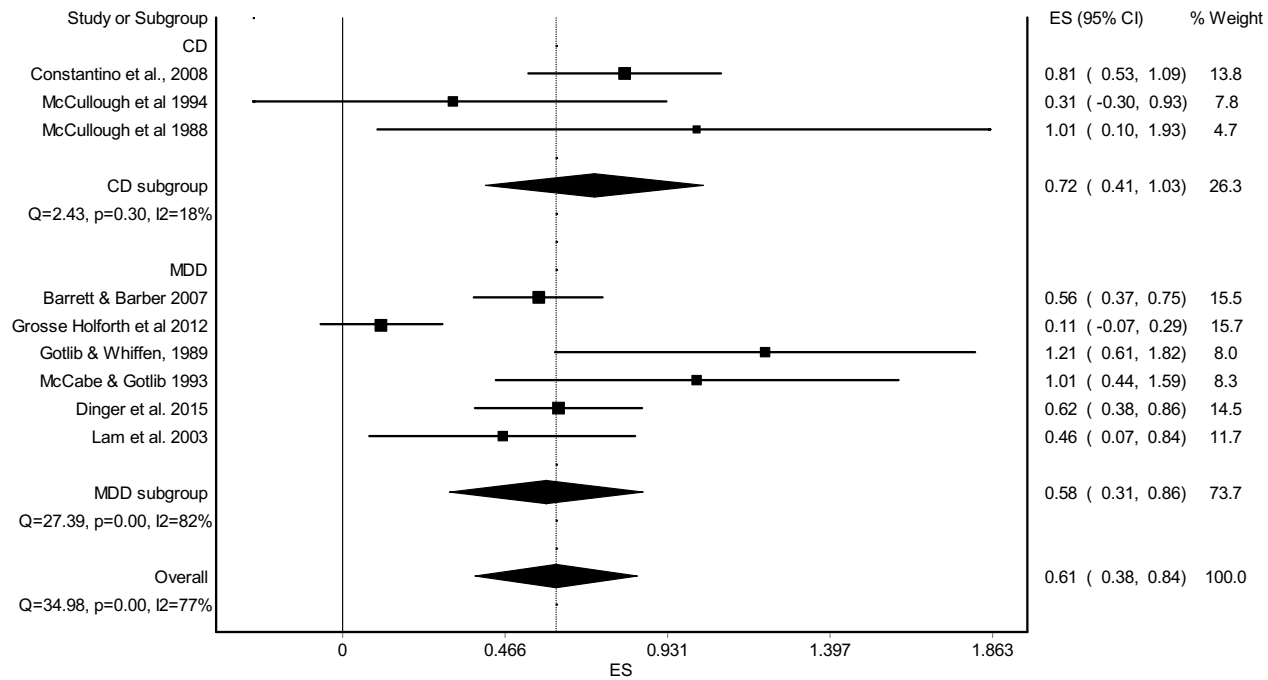


Figure 2. Random Effects meta-analysis for Hostility.

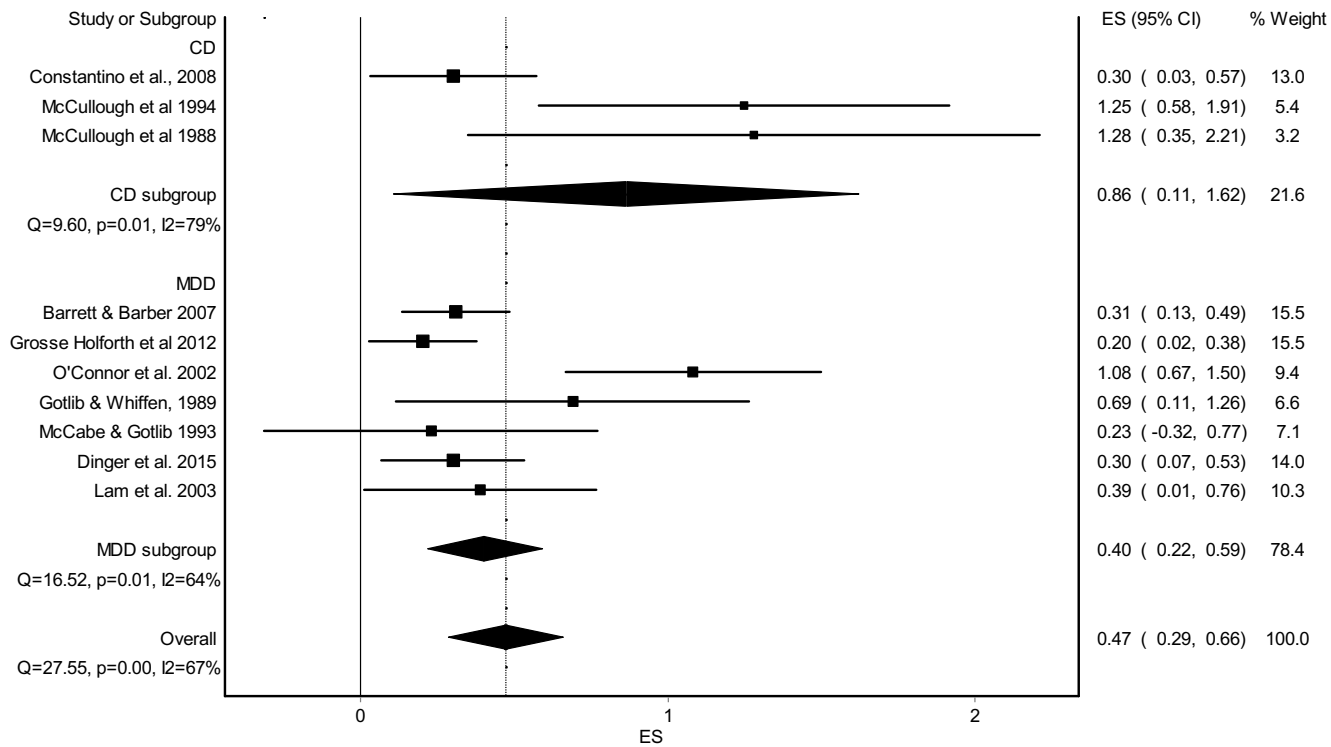


Figure 3. Random Effects meta-analysis for Submissiveness.

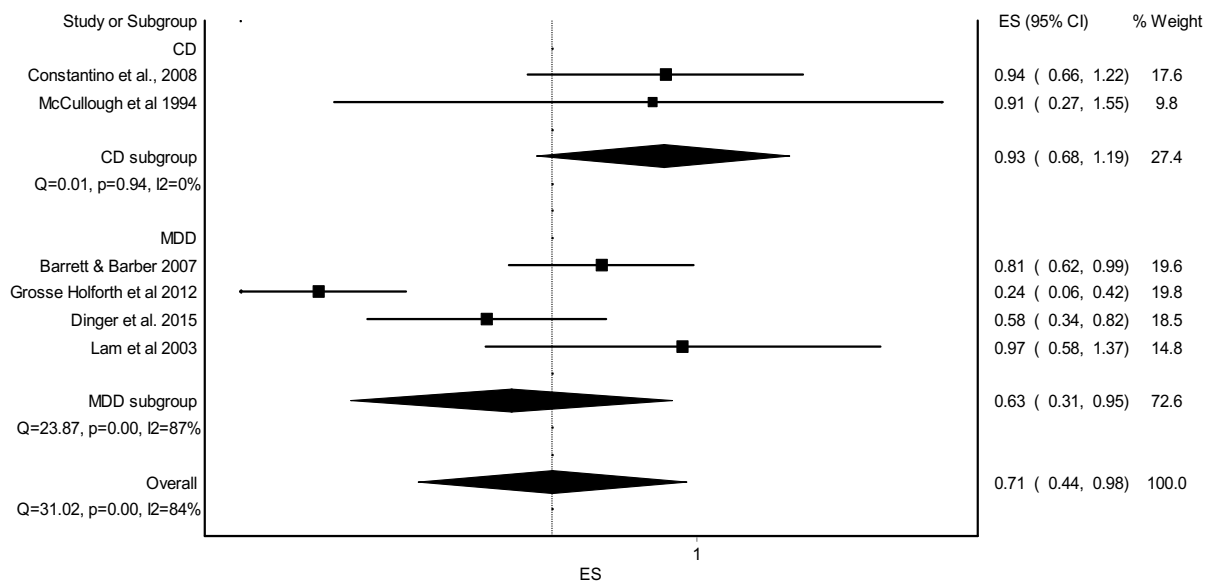


Figure 4. Random Effects meta-analysis for hostile-submissiveness.

Table 1. Quality ratings of studies included in the review.

Study	Recruitment Strategy	Sample size calculation	Total N	Participation Rate > 75%	Depression measure	Interpersonal style measure	Eligibility criteria specified	Quality score
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Bagby et al. (1997)	Not specified	Not reported	25 – 129	Yes	Clinical interview	Validated measure	Yes	6
Barrett et al. (2007)	Not specified	Not reported	500+	Yes	Clinical interview	Validated measure	Yes	8
Constantino et al. (2008)	Not specified	Not reported	130 – 499	Yes	Clinical interview	Validated measure	Yes	7
Gotlib and Whiffen (1989)	Not specified	Not reported	25 – 129	No/Not reported	Clinical interview	Validated measure	Yes	4
Grosse Holtforth et al. (2012)	Not specified	Not reported	500+	Yes	Clinical interview	Validated measure	Yes	8
McCabe and Gotlib (1993)	Randomised	Not reported	25 – 129	No/Not reported	Clinical interview	Validated measure	No	5
McCullough et al. (1994)	Not specified	Not reported	25 – 129	No/Not reported	Clinical interview	Validated measure	Yes	4
McCullough et al. (1988)	Not specified	Not reported	25 – 129	Yes	Clinical interview	Validated measure	Yes	6
O'Connor et al. (2002)	Not specified	Not reported	25 – 129	No/Not reported	Screening tool only	Validated measure	No	1
Lam et al. (2003)	Not specified	Not reported	25 – 129	Yes	Clinical interview	Validated measure	No	5
Dinger et al. (2015)	Not specified	Not reported	130 – 499	Yes	Clinical interview	Validated measure	Yes	7
Cain et al. (2012)	Not specified	Not reported	130 – 499	Yes	Clinical interview	Validated measure	Yes	7

Table 2. Summary of included studies.

Author, country	Design	Sample (country, population, gender)	Age (mean, range)	Diagnosis	Depression measure	Submissivene ss measure	Hostile- submissiveness measure	Hostility measure
Constantino et al. (2008), USA	Cross-sectional	Chronic MDD, N = 442, 65.8% Female	43.9 (SD = 10.5, 18-75	Chronic MDD	HRSD	IMI	IMI	IMI
McCullough et al. (1994), USA	Cross-sectional	n = 24. Dysthymia	39.7 (SD = 8.6), 19-73	Chronic depression,	HRSD	IMI	IMI	IMI
McCullough et al. (1988), USA	Longitudinal	N = 34, dysthymia 76% female.	Mean age 31.7 years	Dysthymia, MDD	HRSD; BDI	IMI	IMI	IMI
Barrett et al. (2007), USA	Cross-sectional	MDD, n = 141 (60% female); normative controls (n = 800)	M = 37.8 (SD = 12.1), 19-68, controls n = 800 18 - 89, 50% female,	MDD	HRSD	IIP-C	IIP-C	IIP-C
Grosse Holforth et al. (2012), Switzerland	Cross-sectional	MDD, N = 180 (58.9% female); comparison sample of outpatients with various diagnoses n = 491. 53.6% female	35.8 years (SD = 12.0), 15 - 80.	MDD	BDI	IMI	IMI	IMI

Author, country	Design	Sample (country, population, gender)	Age (mean, range)	Diagnosis	Depression measure	Submissivene ss measure	Hostile- submissiveness measure	Hostility measure
O'Connor et al. (2002), USA	Cross- sectional	n = 102; 50 inpatients with depression, 52 student controls; 52.9% female N = 52 (20 MDD inpatients and partners, 14 non-depressed inpatients and partners, 18 control couples), 47% female clinical samples	M nonpatient sample = 20.2 (SD = 2.6), patients = 39.2 (SD = 10.7) Age M = 46.15 (SD = 8.24), non- depressed (M = 40.89, SD = 6.89), range 18-60	MDD	BDI	SBS		
Gotlib and Whiffen (1989), Canada	Cross- sectional			MDD	BDI	IMI	IMI	IMI
McCabe and Gotlib (1993), Canada	Cross- sectional	N = 53 females (n = 23 with MDD, n = 30 no depression)	Age (M = 29.0 for depressed sample, M = 28.5 non- depressed)	MDD	BDI	IMI		IMI
Bagby et al. (1997), Canada	Cross- sectional	MDD patients. N = 125 (78 females), 51 included in analyses.	Age M = 34.3, SD = 9.2	MDD	HRSD			NEO
Lam et al. (2003), UK	Cross- sectional	N = 109, 55% female	Age M = 44.4 (SD = 12.8)	MDD	BDI	IIP32	IIP32	IIP32

Author, country	Design	Sample (country, population, gender)	Age (mean, range)	Diagnosis	Depression measure	Submissivene ss measure	Hostile- submissiveness measure	Hostility measure
Dinger et al. (2015), Germany/US A	Cross- sectional	MDD patients (n = 283), 63.6% female	Age (M = 36.9, 11.5)	MDD	BDI	IIP-C	IIP-C	IIP-C
Cain et al. (2012), USA	Cross- sectional	N = 312 No information on gender	Age range 18-45	MDD	LIFE	NEO		

Measures: BDI: Beck Depression Inventory; LIFE: Longitudinal Interval Follow-up Evaluation; IIP: Inventory of Interpersonal Problems; IIP-C: Inventory of Interpersonal Problems – Circumplex Scale; IMI: Impact Message Inventory; HRSD: Hamilton Rating Scale for Depression; SBS: Submissive Behaviour Scale; NEO: Personality Inventory – Revised NEO

